EZ Connect™

Wireless Access Point

- Protocol-independent networking functionality
- 11 Mbps data rate per channel: provides alternative for wired LANs that can dramatically cut costs
- Coverage area 590ft (180m) at 11 Mbps, 1800ft (550m) at 1 Mbps
- Seamless connectivity to wired Ethernet LANs augments existing networks quickly and easily
- Direct Sequence Spread-Spectrum (DSSS) technology provides robust, and secure wireless connection
- Easy installation
- Dual dipole antenna

SMC®
N e t w o r k s

User Guide
SMC2655W

EZ Connect
Wireless Access Point
User Guide

The easy way to make all your network connections

SMC®
N e t w o r k s

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EZ CONNECT
WIRELESS ACCESS
POINT

SMC2655W

SMC's EZ Connect Wireless Access Point is an 11 Mbps wireless repeater that seamlessly integrates with existing Ethernet networks to support applications such as mobile users or temporary conferences. This solution offers fast, reliable wireless connectivity with considerable cost savings over wired LANs (which include long-term maintenance overhead for cabling.) Just install enough wireless access points to cover your network area, plug wireless cards into your notebooks or install wireless adapters into your desktops, and start networking.

Using this device in conjunction with SMC's EZ Connect Wireless Cards, you can create an instant network that integrates seamlessly with 10 Mbps Ethernet LANs. Moreover, moving or expanding your network is as easy as moving or installing additional access points – no wires!

Package Checklist

EZ Connect Wireless Access Point package includes:

- 1 EZ Connect Wireless Access Point with dual dipole antenna (SMC2655W)

- 1 9V DC power adapter

- 1 utility diskette

- This User Guide

Please register this product and upgrade product warranty at www.smc.com.

Please inform your dealer if there are any incorrect, missing or damaged parts. If possible, retain the carton, including the original packing materials. Use them again to repack the product in case there is a need to return it for repair.

Hardware Description

SMC's EZ Connect Wireless Access Point serves as a Media Access Control (MAC) bridge between your wired Local Area Network (LAN) and one or more Wireless Local Area Networks (WLANs).

Just attach the access point anywhere along your Ethernet LAN to provide wireless stations within its area of coverage with transparent access to the local wired and wireless LAN.

The EZ Connect Wireless Access Point supports an 11 Mbps half-duplex connection to Ethernet networks for each active channel. It is fully compliant with 2.4 GHz DSSS CSMA/CA wireless networking as defined in IEEE 802.11b, and 10 Mbps Ethernet as defined in IEEE 802.3

Applications

The EZ Connect Wireless products offer a fast, reliable, cost-effective solution for wireless client access to the network in applications such as:

- **Remote access to corporate network information**
  E-mail, file transfer and terminal emulation

- **Difficult-to-wire environments**
  Historical or old buildings, asbestos installations, and open areas where wiring is difficult to employ

- **Frequently changing environments**
  Retailers, manufacturers and banks who frequently rearrange the workplace and change location

- **Temporary LANs for special projects or peak time**
  Trade shows, exhibitions and construction sites which need temporary setup for a short time period. Retailers, airline and shipping companies who need additional workstations for a peak period. Auditors who require workgroups at customer sites.

- **Access to databases for mobile workers**
  Doctors, nurses, retailers, white-collar workers who need access to databases while being mobile in the hospital, retail store or office campus.

- **SOHO (Small Office and Home Office) users**
  SOHO users who need easy and quick installation of a small computer network functions.

LED Indicators

The EZ Connect Wireless Access Point includes three status LED indicators, as described in the following figure and table.

LED		Status	Description
Power (PWR)		On	Indicates the power is being supplied
Wireless	TX	Flashing Green	Indicates that the Access Point is transmitting data through wireless links
	RX	Flashing Orange	Indicates that the Access Point is receiving data through wireless links
Ethernet	LNK	On Green	Indicates a valid Ethernet cable link
	ACT	Flashing Orange	Indicates that the Access Point is transmitting or receiving data on the Ethernet LAN

System Requirements

Before you install the EZ Connect Wireless Access Point, be sure you can meet the following requirements:

- An A/C power outlet (100~240V, 50~60Hz) which will supply power for the access point

- An available RJ-45 (UTP) port on a 10BASE-T Ethernet hub or switch.

- 802.11 compliant wireless ethernet adapters with TCP/IP compatible protocol installed.

- Management Utility for configuration.

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INSTALLATION

1. Select the Site - Choose a proper place for your SMC2655W Access Point. In general, the best location to place the access point is at the center of your wireless coverage area, within line of sight to all your mobile stations.

2. Stand the Antenna - Stand the antenna. Proper placement will improve performance. Try to place the access point in a position that can best cover its BSS (refer to page 15). Normally, the higher you place the antenna, the better the performance.

Power socket   RJ-45 connector socket
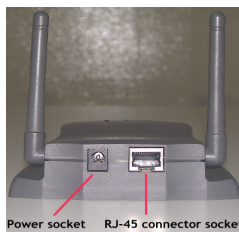
3. Connect the Ethernet Cable - The SMC2655W can be wired to a 10 BASE-T Ethernet with a network device such as a hub or a switch. Connect into the RJ-45 connector socket on the back panel with category 3, 4 or 5 UTP Ethernet cable and an RJ-45 connector.

4. Connect the Power Cable - Connect the power adapter cable to the 9V DC power socket on the rear panel.

Warning: ONLY USE the power adapter supplied with the SMC2655W. Otherwise, the product may be damaged.

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SMCPWR-INJ*

POWER INJECTOR

The PoE Power Injector allows the SMC2655W Access Point to receive power from the Ethernet cable.

The Power Injector can be used with an Access Point that has limited access to a standard electric outlet.

Follow these steps to install the Power Injector:

SMC2655W

HUB/Switch
Power Adapter

1. Connect the power adapter cable from the power supply to the Power Injector.

2. Plug the power cord into a power outlet. The Power Injector's LED will light up.

3. Connect an Ethernet cable from your HUB/ Switch to the network port (labeled Network) of the Power Injector.

4. Connect another Ethernet cable from the Access Point port of the Power Injector (labeled Access Point) to your Access Point.

* Sold separately

** SMCPWR-INJ is designed for use with SMC2655W Access Point only. Using the Power Injector with any other Ethernet device may cause damage to the device.

CONFIGURATION

Your SMC2655W is a Plug and Play device. This means that, in most cases, you will not need to configure it.

The SMC2655W Access Point includes an SNMP agent accessible through an SNMP manager application (EZ Connect Wireless AP Manager). The SNMP agent supports read-write and read-only modes.

If you are adding this device into an already existing wireless network, or if you need to configure some advanced settings, follow the instructions below.

The diskette labeled "Utility Diskette" that comes with the package contains a SNMP manager program for the EZ Connect Wireless Access Point. Updates can be downloaded from SMC's Web site at **http://www.smc.com.**

Warning: Back up your utility diskette and use the copy as the working diskette to protect the original from accidental damage.

The SMC2655W can be configured over an Ethernet network using RJ-45 cable. You may connect the SMC2655W to a network device such as a hub or switch. Then, run the utility program, and configure the SMC2655W remotely as described below.

SNMP Management Utility

Windows 98/Me/NT/2000 Installation

1. Insert the SMC2655W utility disk into the floppy drive on your PC, and then enter the following command: "A:\utility\setup." Follow the on-screen instructions to install the utility program.

2.   When you run the installed utility, click on "Command" and then select "Scan" from the menu. The program will then detect all the SMC2655Ws wired to the Ethernet network.
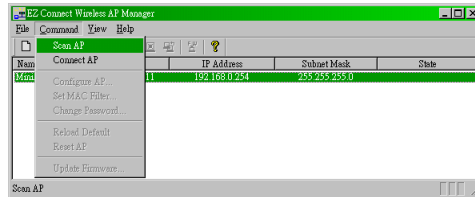
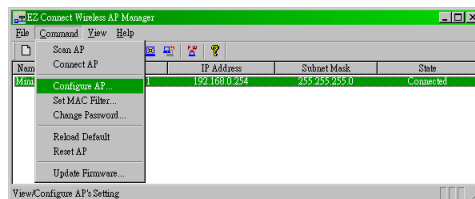3.   From the list of detected SMC2655Ws, select and double click on the unit you want to configure. A message box will examine your password.
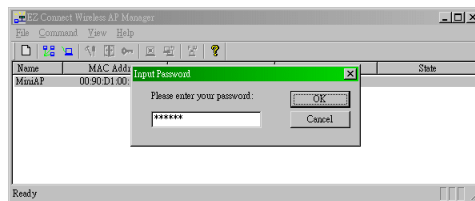
4.   **Please enter your password: "MiniAP" This will let you connect to SMC2655W.**
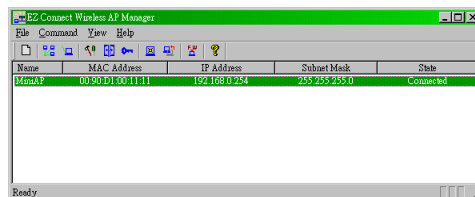
5.   Click on "Command" and select "Configure AP", "Set MAC Filter", "Change Password", "Reload Default", "Reset AP" or "Update Firmware" to the screen required.

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The **Configure AP** screen displays AP status and settings shown above and you can configure the settings.
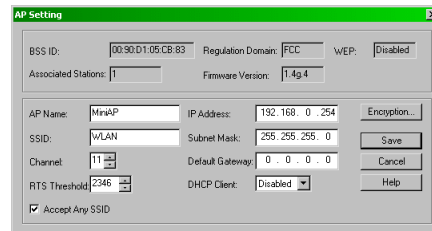
BSS ID **-** Media Access Control (MAC) address.

Regulation Domain **-** Different countries have different Regulation Domains which allow only specific radio frequencies.

WEP **-** WEP (Wired Equivalent Privacy) Disabled/ Enabled status.

Associated Stations **-** Amount of wireless client.

Firmware Version **-** Here shows Firmware version.

In the Configure AP page, set the parameters and then click on "Save" to implement the settings.

AP Name - Set your Access Point alias name. (Default: "MiniAP")

SSID - This should be set to the same value as other stations in your network. (Default: "WLAN")

Channel - Set the channel number as the operating radio channel. (Default: "11").

   Note: The available channel settings are limited to local regulations which determine which channels are available.

   FCC/IC: 1-11, ETSI: 1-13, France: 10-13, Spain: 10-11, MKK: 1-14.

RTS Threshold - Set the RTS Threshold to enable the RTS/CTS mechanism. (Default: 2,346, which means Disabled)

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Accept "ANY" SSID - Checking this box will enable the Access Point to accept the association of wireless clients, using "ANY" as their SSID. If this feature is disabled(the box is not checked), the wireless clients must use the same SSID as the Access Point(thus enhancing security).

IP Address - Set the IP address as required. (Default: "192.168.0.254")

Note: The available IP address settings as follows:

	First digit	Second digit	Third digit	Fourth digit
Range	1~223	0~255	0~255	0~254

Subnet Mask - Set the Subnet Mask as required. (Default: "255.255.255.0")

Note: The available Subnet Mask settings as follows:

	First digit	Second digit	Third digit	Fourth digit
Range	0~255	0~255	0~255	0~254

Default Gateway - Set the default gateway as required. (Default: "0.0.0.0")

Note: The available Default Gateway settings as follows:

	First digit	Second digit	Third digit	Fourth digit
Range	1~223	0~255	0~255	0~254

DHCP - You can enable the DHCP Client function to get IP Address, Subnet Mask and Default Gateway automatically from the DHCP server in your network. (Default: "Enabled")

Note: If DHCP server doesn't exist in your network, then the Access Point will automatically start up with the values in the IP Address field.
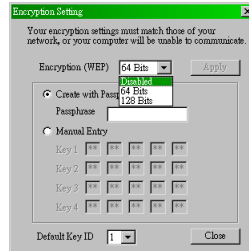
10

Encryption - Click Encryption button for the WEP setting.

WEP - For more secure data transmission, set the "64-Bit" or "128-Bit" to ensure wireless network security. Wired Equivalent Privacy (WEP) is implemented in this device to prevent unauthorized access to your wireless network. The 128-Bit setting gives a higher level of security but the setting must be the same as other clients in your wireless network. (Default: Disabled)

Create with Passphrase - The security key for WEP encryption is generated from your Passphrase string, so it must be the same as all the other stations in your network.

Manual Entry - Allows the user to manually enter key elements. (2 Hexadecimal digits in each block)

Key 1~4 - Each Key ID contains 10 HEX digits but 128-Bit encryption has only 1 Key which contains 26 HEX digits. All wireless devices must have the same Key ID element values to communicate.

Default Key ID - Choose the Key ID that has the encryption string you prefer. If using a key generated from a Passphrase, you must use the same Passphrase and key on each station.

In the **Set MAC Filter** screen, you can decide which wireless devices are allowed to connect to the Access Point by controlling the MAC address. Other wireless devices which are not in the table will be rejected by the Access Point.

Filtering - Choose "Enabled" to enable MAC Filter. (Default: Disabled)
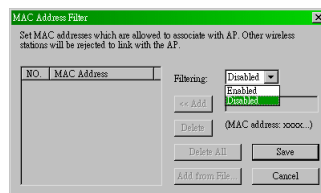
Key in the MAC address which you prefer.

   Note: The format is 12 hexadecimal digits. e.g. 0090D112AB89.
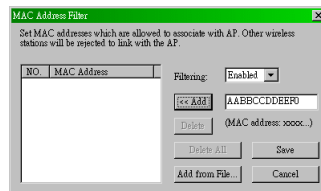
Click "Add" to add to the left of the table and then click "Save" to save the changes.

Otherwise click "Add from File..." to add a text file which contains MAC address similar to the below table and then click "Save" to save the changes.

Note: The table allows you to set a maximum of 20 MAC addresses.
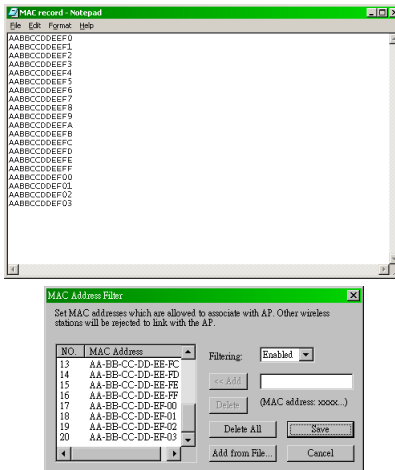
In the **Change Password** screen you may change the password on the Access Point.

A password is required to configure the SMC2655W. We suggest changing your password from the default value to ensure network security.

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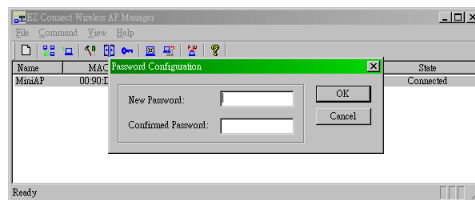
The **Reload Default** screen will let you reload the factory default setting.
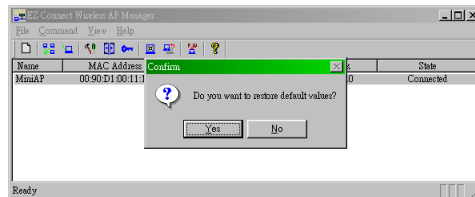
Please refer to the table below for default values.

Unit	Default value
AP Name	MiniAP
SSID	WLAN
Channel	11
RTS Threshold	2346
IP Address	192.168.0.254
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0
DHCP Client	Enabled
Encryption	Disabled
MAC Address Filter	Disabled
Password	MiniAP

The **Reset AP** screen will let you reboot the Access Point.
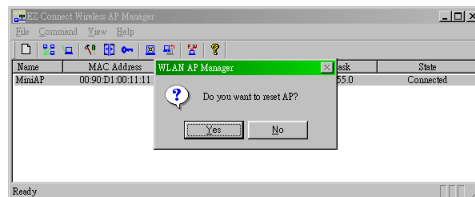
The **Update Firmware** screen allows you to upgrade the firmware of Access Point.
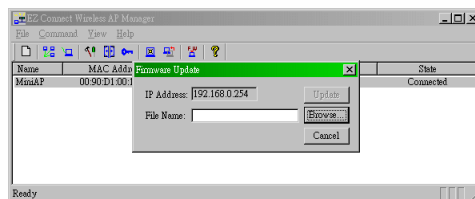
Enter the file name or browse for the file containing the updated firmware.

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NETWORK CONFIGURATION AND PLANNING

SMC's EZ Connect Wireless Solution supports a stand-alone wireless network configuration, as well as an integrated configuration with 10Mbps Ethernet LANs.

The SMC wireless network cards and adapters can be configured as:

• Ad hoc for departmental or SOHO LANs

• Infrastructure for enterprise LANs

Network Topologies

Ad Hoc Wireless LAN

An ad hoc wireless LAN consists of a group of computers, each equipped with a wireless adapter, connected via radio signals as an independent wireless LAN. Computers in a specific ad hoc wireless LAN must therefore be configured to the same radio channel.

An ad hoc wireless LAN can be used for a branch office or SOHO operation.

Ad Hoc Wireless LAN

Notebook with Wireless USB Adapter

Notebook with Wireless PC Card

PC with Wireless PCI Adapter

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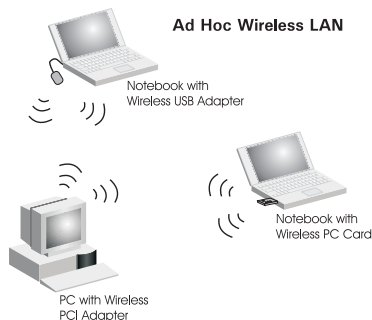
Infrastructure Wireless LAN

The SMC2655W can also provide access to a wired LAN for wireless workstations. An integrated wired and wireless LAN is called an Infrastructure configuration. A Basic Service Set (BSS) consists of a group of wireless PC users, and an access point that is directly connected to the wired LAN. Each wireless PC in this BSS can talk to any computer in its wireless group via a radio link, or access other computers or network resources in the wired LAN infrastructure via the access point.

The infrastructure configuration not only extends the accessibility of wireless PCs to the wired LAN, but also doubles the effective wireless transmission range for wireless PCs by passing their signal through one or more access points.

A wireless infrastructure can be used for access to a central database, or for connection between mobile workers, as shown in the following figure.

**Wired LAN Extension
to Wireless Adapters**

File
Server

Desktop PC

Switch

Notebook with Wireless
PC Card Adapter

Access Point

PC with Wireless
PC I Adapter

16
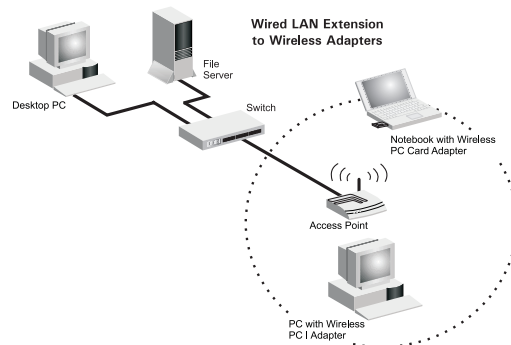
Setting the Communication Domain

Stationary Wireless PCs

The Basic Service Set (BSS) is the communication domain for each SMC2655W access point. For wireless PCs that do not need to support roaming, set the domain identifier (SSID) for the wireless card to the BSS ID of the access point you want to connect to. Check with your administrator for the BSS ID of the SMC2655W access point he wants you to connect to.

Roaming Wireless PCs

A wireless infrastructure can also support roaming for mobile workers. More than one access point can be configured to create an Extended Service Set (ESS). By placing the access points so that a continuous coverage area is created, wireless users within this ESS can roam freely. All SMC wireless network cards and adapters and SMC2655W access points within a specific ESS must be configured with the same SS ID.

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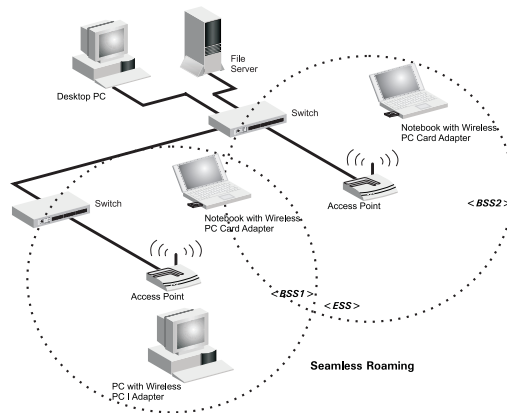
TROUBLESHOOTING

Check the following items before contacting SMC Technical Support.

1. If mobile users do not have roaming access to the SMC2655W access point, check the following:

    • Make sure that all the SMC2655Ws and stations in the ESS in which the WLAN mobile users can roam are configured to the same WEP setting, SSID and authentication algorithm.

2. If you can not connect to SMC2655W by utility:

    • Make sure that your local IP domain conform to the SMC2655W.

3. If you forget your password or your SMC2655W has locked up, you can reset it to factory defaults by performing the following steps:

    • Power off the SMC2655W.

    • Push in the reset button located on the back of the SMC2655W.

    • While holding in the button, apply power to the AP.

    • The AP will start to load the default settings.

    • Wait for about 5 seconds. Release the Push Button, then the AP will restart with the factory default settings.

SMC Networks 802.11b Wireless Access Point SMC2655W Maximum Distance Table

Important Notice:

Maximum distances posted below are actual tested distance thresholds. However, there are many variables such as barrier composition and construction and local environmental interference that may impact your actual distances and cause you to experience distance thresholds far lower than those we post below. If you have any questions or comments regarding the features or performance of this product, or if you'd like information regarding our full line wireless products, you can visit us on the web of www.smc.com or you can call us toll-free at 800.SMC.4YOU. SMC Networks stands behind this and every product we sell with a 30 day satisfaction guarantee and with a limited-lifetime warranty.

SMC Wireless Access Point				
SMC2655W Maximum Distance Table				
	Speed and Distance Ranges			
Environmental Condition	11Mbps	5.5Mbps	2Mbps	1Mbps
Open Environment: a "line-of-site" environment with no interface or obstructions between Access Point and Users.	180m(590ft)	300m(984ft)	450m(1476ft)	550m(1800ft)
Semi-Open Environment: An environment with no major obstructions such as walls or privacy cubicles between Access Point and users.	50m(164ft)	70m(230ft)	90m(295ft)	120m(394ft)
Closed Environment: A typical office and home environment with floor to ceiling obstructions between Access Point and users.	25m(82ft)	35m(115ft)	45m(148ft)	55m(180ft)

COMPLIANCES

FCC Class B Certification

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

Warning! This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the distance between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from the one which the receiver is connected to.

• Consult the dealer or an experienced radio/ TV technician for help.

CSA Statement (Canada)

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radio-électriques dépassant les limites applicables aux appareils numériques de la classe B prescrites dens le Règlement sur le brouillage radioélectrique édicté par l'Industrie.

CE Mark Declaration of Conformance

This is to certify that this product complies with ISO/IEC Guide 22 and EN45014. It conforms to the following specifications:

EMC: EN55022(1988)/CISPR-22(1985) Class B

IEC 61000-4-2(2000)	4kVCD/8kVAD
IEC 61000-4-3(2000)	3V/m
IEC 61000-4-4(2000)	1kV- (power line)
IEC 61000-4-6(2000)	3Vrms
IEC 61000-4-11(2000)	3Vrms

SPECIFICATIONS

Model
SMC2655W

Maximum Channels
US & Canada: 11, Europe (ETSI): 13, Japan: 14

Maximum Clients
64

Operating Range
Maximum distance of 11Mbps: 180m (590ft)
Maximum distance of 5.5Mbps: 300m (984ft)
Maximum distance of 2Mbps: 450m (1476ft)
Maximum distance of 1Mbps: 550m (1800ft)

Cell Separation (for roaming clients)
200ft (60m) between access points

Data Rate
1, 2, 5.5 , 11 Mbps per channel

Network Configuration
LAN to access point to wireless card,
access point to wireless card,

Operating Frequecy
USA, Canada: 2.400-2.4835 GHz,
Europe(ETSI): 2.400-2.4835 GHz,
Japan: 2.400-2.497 GHz

Sensitivity
1, 2, 5.5 Mbps: Min. -82 dBm
11 Mbps: Min. -78 dBm

Modulation
CCK, BPSK, QPSK

Power supply
Input: 110~120V, 220~240V AC, 50-60 Hz;
Output: 9V DC, 1A

Output Power
>+15 dBm

Physical Size
5.4 x 4.25 x 1.18 in, (13.73 x 10.8 x 3.01 cm)

Weight
7.4 oz (210 grams)

LED Indicators
Power, Ethernet Link/Activity, Wireless Activity

Network Management
Windows 98/Me/NT/2000 SNMP Management
Utility

Operating System
Windows 98/Me/NT/2000

Encryption
64-bit/128-bit key

Compliances
CE Mark
    EN55022 Class B
    EN55024
    IEC 61000-42/3/4/6/11
Emissions FCC Part 15(B)
    ETS 300 328
    RCR STD-33A
Safety
    CSA/NTRL (CSA 22.2 No. 950 & UL 1950)
    EN60950 (TÜV/GS)
Vibration/Shock/Drop
    IEC 68-2-34/IEC 68-2-32

Standards
IEEE 802.3 10BaseT, IEEE 802.11b

Warranty
Limited Lifetime

Model
SMCPWR-INJ

Input Voltage
7Vdc~35Vdc

RJ45 Port Pin Assignments (for AP)
4/5(+), 7/8(-)

Output Voltage
Input voltage

Size
2.25 x 2 x 1 in

Connectors
Two RJ-45 Connectors; One labeled Access Point
and one labeled Network

Weight
2.1 oz

TERMINOLOGY

The following is a list of terminology that is used in this document.

Access Point - An internetworking device that seamlessly connects wired and wireless networks.

Ad-Hoc - An Ad-Hoc wireless LAN is a group of computers each with LAN adapters, connected as an independent wireless LAN.

Backbone - The core infrastructure of a network. The portion of the network that transports information from one central location to another central location where it is unloaded onto a local system.

Base Station -In mobile telecommunications, a base station is the central radio transmitter/receiver that maintains communications with the mobile radiotelephone sets within its range. In cellular and personal communications applications, each cell or micro-cell has its own base station; each base station in turn is interconnected with other cells' bases.

BSS - BSS stands for "Basic Service Set". It is an Access Point and all the LAN PCs that are associated with it.

ESS - ESS (ESS-ID, SSID) stands for "Extended Service Set". More than one BSS is configured to become an Extended Service Set. LAN mobile users can roam between different BSSs in an ESS (ESS-ID, SSID).

Ethernet - A popular local area data communications network, which accepts transmission from computers and terminals. Ethernet operates on a 10 Mbps base band transmission rate, using a shielded coaxial cable or over shielded twisted pair telephone wire.

Infrastructure - An integrated wireless and wired LAN is called an Infrastructure configuration.

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Roaming - A wireless LAN mobile user moves around an ESS and maintains a continuous connection to the Infrastructure network.

RTS Threshold – Transmitters contending for the medium may not be aware of each other. RTS/CTS mechanism can solve this " Hidden Node Problem". If the packet size is smaller than the preset RTS Threshold size, the RTS/CTS mechanism will NOT be enabled.

WEP – "Wired Equivalent Privacy" is based on the use of 64-bit keys and the popular RC4 encryption algorithm. Wireless devices without a valid WEP key will be excluded from network traffic.

FOR TECHNICAL SUPPORT, CALL:

From U.S.A. and Canada (24 Hours a day, 7 Days a Week)
  (800) SMC-4-YOU; (949) 707-2400; (949) 707-2460 (Fax)
From Europe (8:00 AM - 5:30 PM UK Greenwich Mean Time)
  44 (0) 1189748740; 44 (0) 1189748741 (Fax)

INTERNET

E-mail addresses:

  techsupport@smc.com

  european.techsupport@smc-europe.com

Driver updates:

  http://www.smc.com/support.html

World Wide Web:

  http://www.smc.com/

FTP Site:

  ftp.smc.com

FOR LITERATURE OR ADVERTISING RESPONSE, CALL:

U.S.A. and Canada:	(800) SMC-4-YOU;	Fax (949) 707-2460
Spain:	34-93-477-4920;	Fax 34-93-477-3774
UK:	44 (0) 1189 748700;	Fax 44 (0) 1189 748701
Southern Europe:	33 (1) 41.18.68.68;	Fax 33 (1) 41.18.68.69
Central/E. Europe:	49 (0) 89 92861-200;	Fax 49 (0) 89 92861-230
Nordic:	46 (8) 564 33145;	Fax 46 (8) 87 62 62
Middle East:	971-48818410;	Fax 971-48817993
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